High School Department

173D EXAMINATION

ALGEBRA

Tuesday, March 25, 1902—9.15 a. m. to 12.15 p. m., only

Answer the first four questions and four of the others but **no more.** *If more than four of the others are answered only the first four answers will be considered. Give each step of solution. Reduce fractions to lowest terms. Express final result in its simplest form and mark it Ans. Each complete answer will receive 12½ credits. Papers entitled to 75 or more credits will be accepted.*

1 Simplify $3x-[y-\{y-\overline{x+y}-(-y-\overline{2y-x-y})\}]$

2 Factor *five* of the following: a^3+216, y^4+y^2+1, m^5+1, a^2-b^2-a-b, $(a+b)^2-(c-d)^2$, $x^{2a}+2x^a+1$, $16a^2+10ab-9b^2$

3 Find the highest common factor (greatest common divisor) of $a^5-11a^4+42a^3-71a^2+61a-30$ and $a^3-9a^2+26a-24$

4 Solve $5x^2-6x=1\frac{2}{5}$

5 Write out by the binomial theorem the first *four* terms of $(a-2b)^8$, giving all the work for finding the coefficients.

6 A boy is $\frac{1}{4}$ as old as his father and 3 years younger than his sister; the sum of the ages of the three is 57 years. Find the age of the father.

7 Solve $\begin{cases} 3x+2y-z=8 \\ 2x+3y+6z=2 \\ x-y-5z=4 \end{cases}$

8 Extract the square root of $a^{4m}+4a^{3m}+2a^{2m}-4a^m+1$

9 Solve $\begin{cases} x^2-4y^2=13 \\ x+2y=13 \end{cases}$

10 The difference between the contents of two cubic blocks is 387 cubic feet; an edge of the smaller block is 3 feet shorter than an edge of the larger block. Find the edge of each block.

11 Solve $\frac{12}{\sqrt{x^2+8}}=\sqrt{x^2+8}+x$

12 Simplify $(x-\sqrt{ax}-6a)\div(\sqrt{x}+2\sqrt{a})$; $\frac{1}{\sqrt[4]{(1+\sqrt[3]{a^2})^3}}$; $(2-2\sqrt{x})^2$